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ABSTRACT

A basic introduction to cable television (CATV) is presented. With newly increased capacity and reduced cost, cable television offers a wide spectrum of potential uses to the community, an important one of which is in education. Schools can use CATV in at least four broad areas: instruction, in-service education, administrative communication, and community information. In this short manual basic policy is discussed and schools are advised to move early to reserve specific channels for education, to provide for connecting the schools to the cables and for necessary information inputs. A checklist for the newcomer to CATV is given. (RB)

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CABLE TV

EDUCATION'S PIPE LINE OR PIPE DREAM

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CATV: EDUCATION'S PIPELINE OR PIPEDREAM

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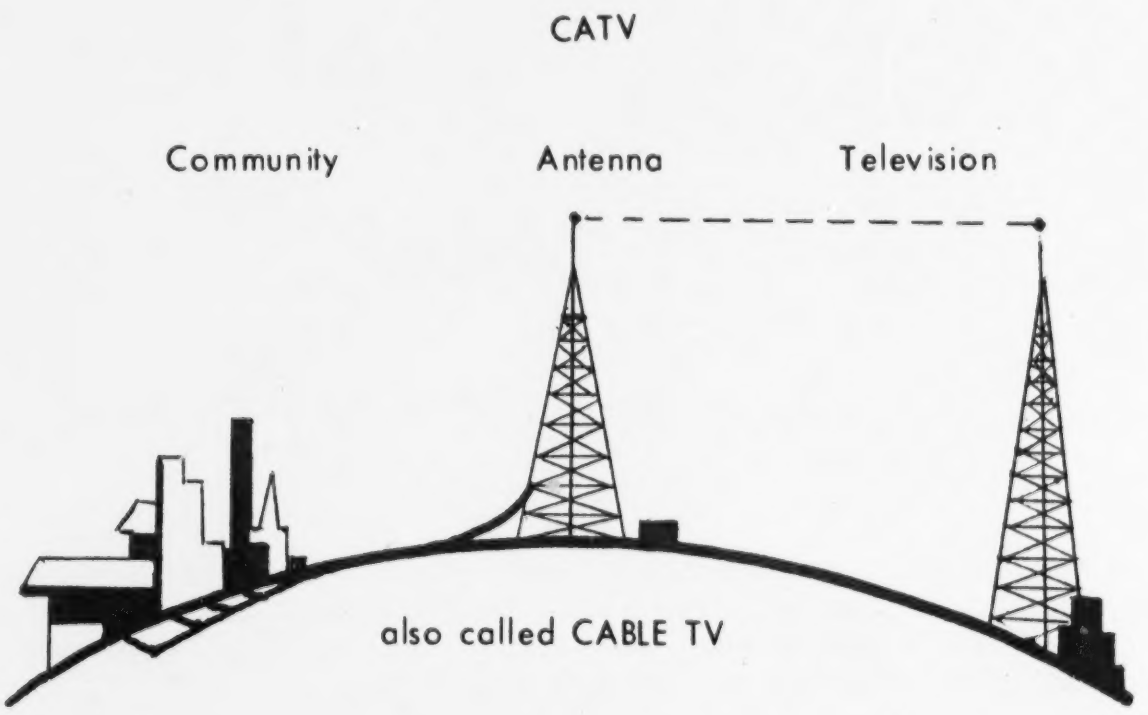
R.R.S.

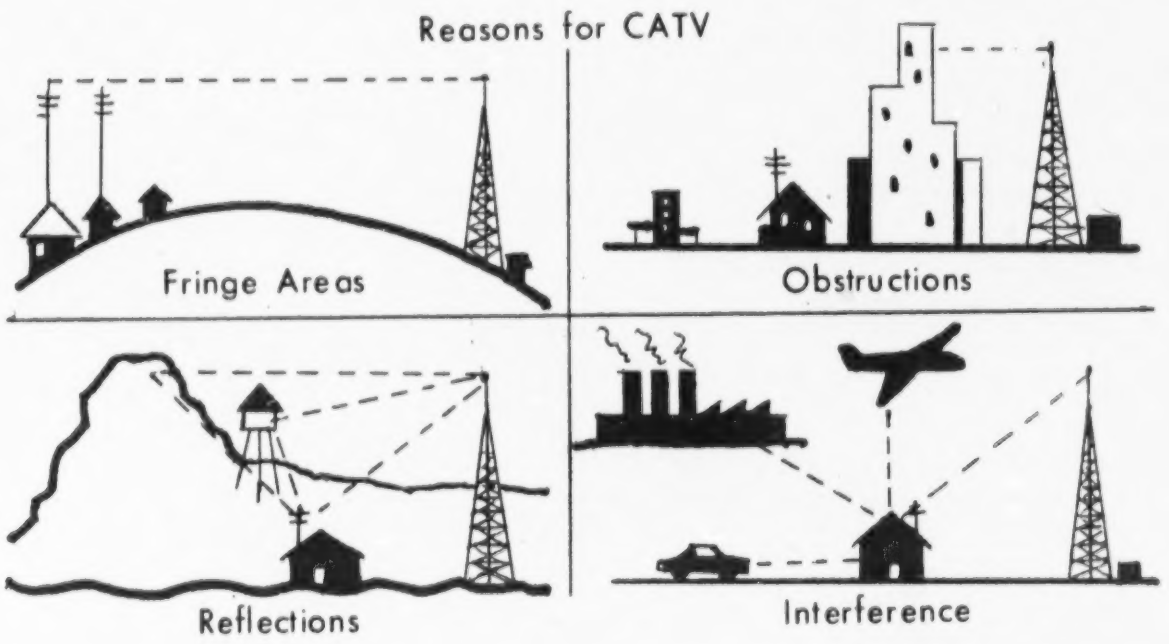
WHAT IS CATV?

The letters CATV stand for Community Antenna Television. The use of CATV began approximately 20 years ago in areas experiencing poor reception with television signals. Areas far from broadcast stations or in mountainous terrain were prime targets for CATV. The idea of CATV is simple. Every television receiver needs an antenna. The weaker the signal coming to the receiver, the better the antenna has to be in order to receive a good picture. Building a tower at a high location with an expensive antenna and running a cable through the streets, connecting the homes, could improve reception.



Because the system uses elaborate cabling to connect homes to the antenna, the CATV system has also become to be known as "Cable Television."

In addition to its uses in fringe areas far from broadcast stations, another use was found for cable systems. In some metropolitan areas, cable television was used to reduce interferences caused by obstructions from buildings or various electrical interferences. For many years, the construction of CATV or Cable Television, was limited to areas far away from television broadcasting stations or in industrial or urban sections where considerable interference was being experienced.



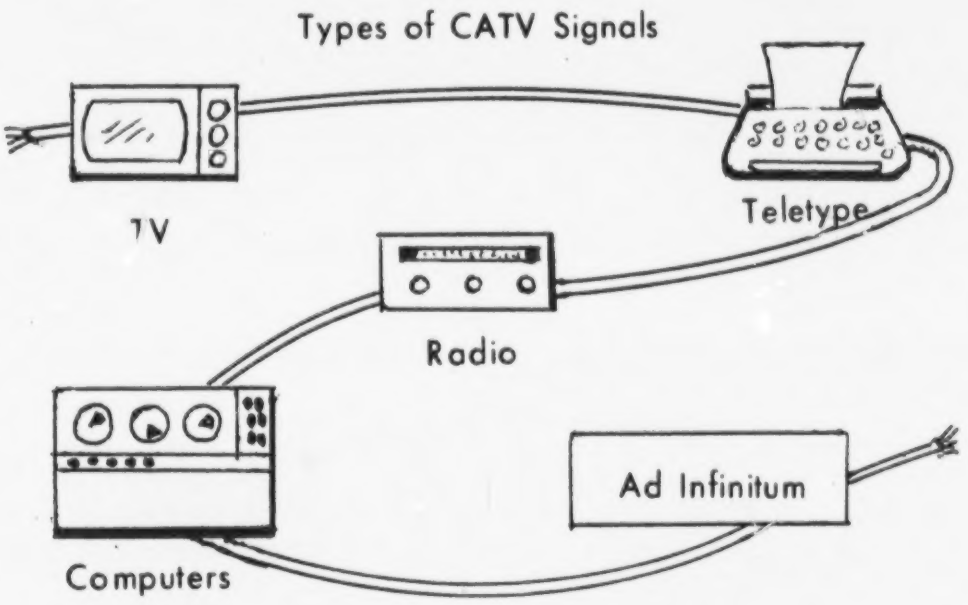
To install cables in streets, it was necessary to obtain permission from local governments. The person or group desiring to establish a cable company had to seek permission from the local government to install cables through the streets and alleys.

At first glance, it would appear that CATV would have limited applications in the United States, restricting itself primarily to remote areas or areas having interference problems.

WHY NEW INTEREST IN CATV?

What, then, has caused the great increase in attention to cable television? First is the cost reduction in installing cable systems. In the early days, the cables used were very limited in their capacity and were rather expensive. Only people experiencing great difficulties in reception were interested in paying the charges necessary to have such a cable installed in their homes. In recent years, it has been possible, through increased technology, to reduce the cost of these cables. Second, the capacity of cables is much increased with the possibility of carrying as many as 30, 60, or more channels on a cable. These two factors have led to the rethinking of the entire cable problem.

With the increased capacity and reduced cost, it becomes possible to think of cable for a wide variety of uses. In addition to expanded channels for television, other kinds of signals such as radio and transmission of computer data can be carried on a cable.

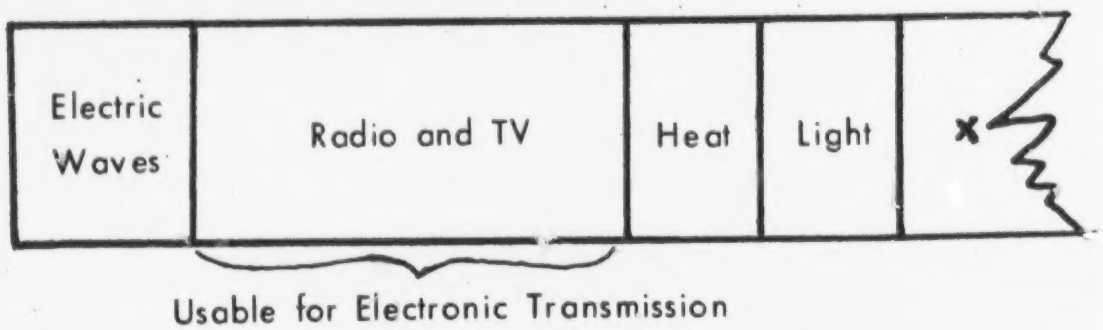


For this reason, the concept of cable technology is looming more important every day as a vital factor in the development of this country. The school administrator should be interested in cable television, because just as cable television can provide very important services in the fields of entertainment, industry and government, it can provide very important services in the area of education. To understand what is possible, it is necessary to understand some of the technical aspects involved in broadcasting and cable transmission.

WHAT ARE THE TECHNICAL ASPECTS INVOLVED IN CABLE TELEVISION?

Radio and television broadcasting is possible because energy can be transmitted through space. This energy is called electromagnetic energy. The usable energies for transmitting radio and television range from the tens of thousands of cycles per second to approximately ten billion cycles per second.

Electro—Magnetic Spectrum



Any transmitter broadcasting in this range of frequencies can be picked up by an antenna and receiver turned to that same frequency range.

During the past 50 years, many uses have been found for this electromagnetic transmission. We all are familiar with broadcast AM and FM radio and television signals. Frequencies also are used by police departments, fire departments, maritime service, aviation traffic control services, the space agency, telephone companies, taxi and trucking companies and many others. In addition, many frequencies are used for military purposes. Because of the great usefulness of these frequencies for transmitting information, the federal government has found it necessary to provide regulations of the airways to control the use of these frequencies. This is the purpose of the Federal Communications Commission.

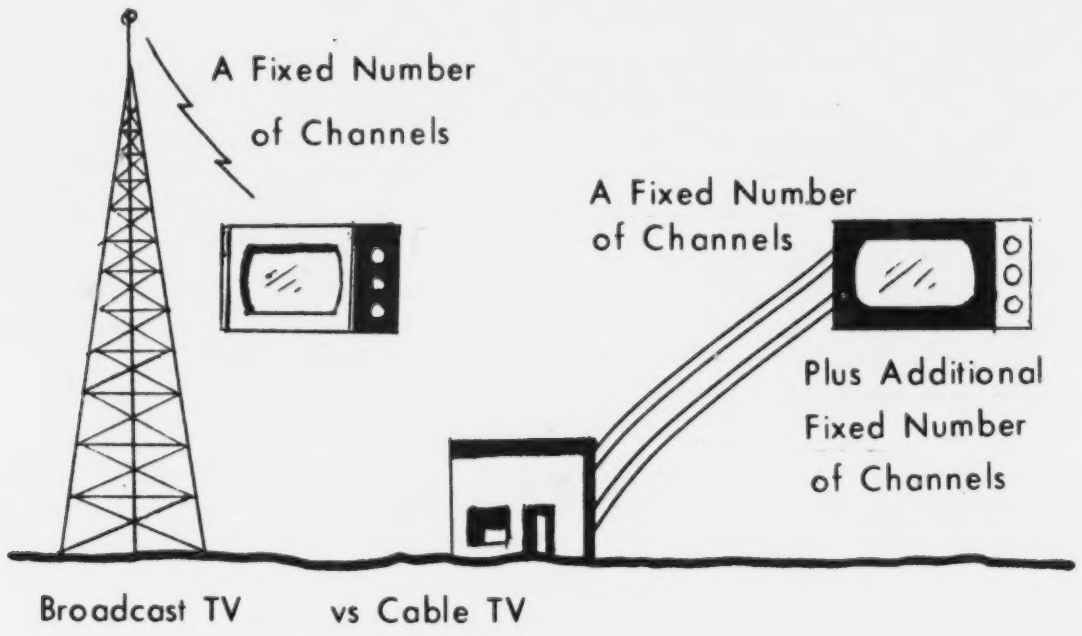
Today there is a shortage of frequencies, particularly in metropolitan areas. Although many groups and agencies would develop radio and television stations and use these frequencies for many purposes, there are not enough frequencies available in many parts of the country to provide for all of the services necessary. Once a set of frequencies is made available to a particular individual company or agency, no one else can use these frequencies in the same area. If more than one transmitter is on the same set of frequencies it would create interference and intelligent information could not be deciphered by the receivers.

Let us examine an example of this problem in the area of television. On the television receivers, in the VHF band, there are listed Channels 2 to 13. Theoretically, in any one area, an individual should have the channels available to him. In reality, this is not possible because there is interference from some distant signals in other cities using these same frequencies. To increase the number of channels available, additional frequencies would have to be reserved. The reservation of additional frequencies for television would mean curtailing other uses such as mobile uses for taxicabs, airplanes, or the police department, in order to provide additional channels for television.

How does this broadcast problem compare to the use of cable? A cable can be developed that would carry the same 12 channels for

Channels 2 to 13. This would be the same as broadcast, but without interference from distant signals since there is no broadcast through the air. It would be possible to install a second, parallel cable since frequencies are in the cable and not through the air.

Cable Capabilities

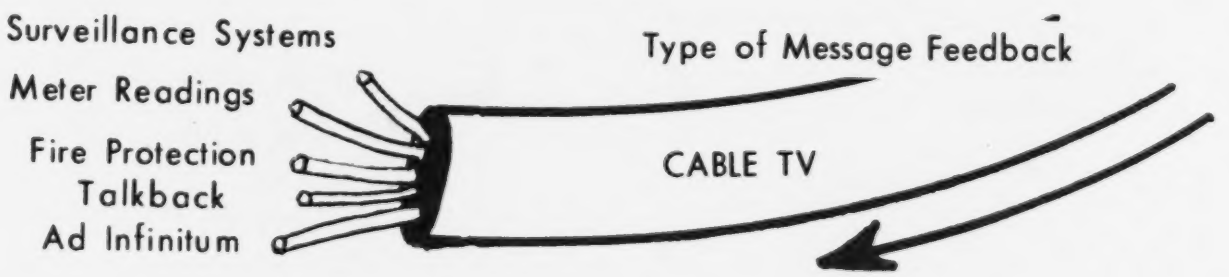


A television receiver could be connected to both cables with a simple switch. When the viewer wished to watch one set of programs, he would throw the switch in one direction and would have available to him 12 programs from the one cable. If he wished to have a greater selection, he could throw the switch in the other direction and watch the other programs, thus giving him a maximum of 24 programs instead of 12. Obviously, it would be possible to connect a third and fourth cable to such a system and provide a greater variety of channels.

We have used the example of television signals being carried, however, a large variety of other kinds of signals could also be carried on the cable. With this concept of multiple cables, it is possible to think of almost an infinite capacity of frequencies available for the simultaneous transmission of a large variety of information.

Through such a system, it will be possible to transmit television and radio material for entertainment, information and instruction, while at the same time, transmitting telemetering information for the control of machines and circuits for industry and other agencies, like Civil Defense. It will be possible to provide teletype information transmission for printing materials such as newspapers in homes, or reports for schools.

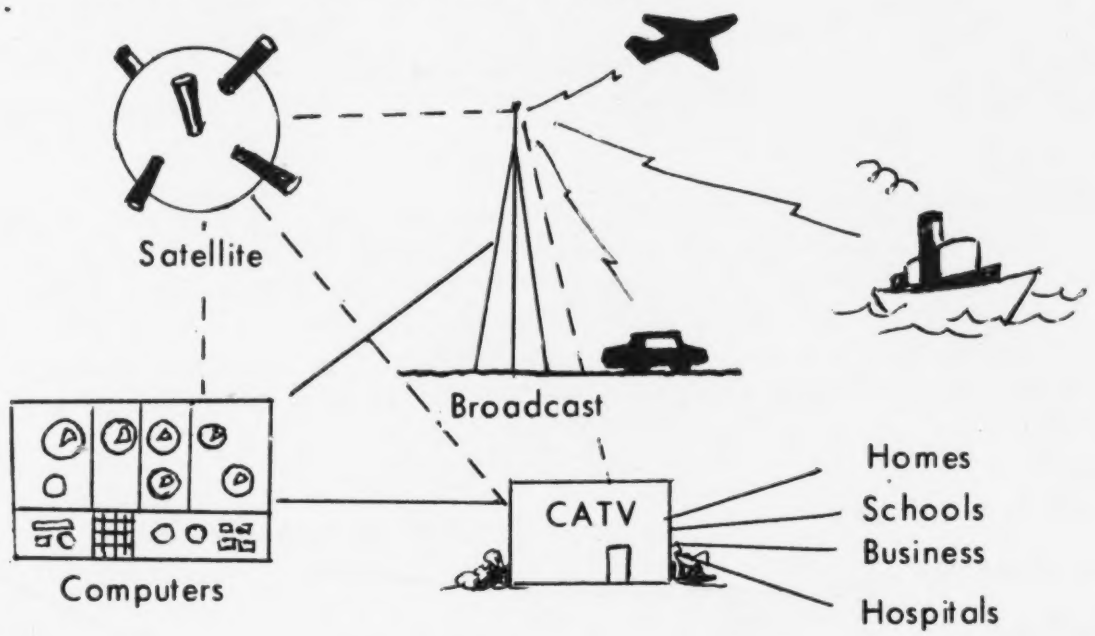
Another advantage of cable television is that it can be two-way. With two-way cable, it is possible to provide surveillance systems to alert the police to break-ins of homes or businesses connected to the system. Similarly, the fire department could be alerted to fires occurring in dwellings connected to the system. Response information could be obtained instantly from a variety of remote locations.



Data could be gathered by computers from any remote source connected into the cable systems. This could be of tremendous advantage in government, industry, education and to the consumer public.

If one envisions a cable system for interconnecting people wherever they may be in permanent locations coupled with a broadcast system used primarily for satellites and transmissions to mobile units of various kinds, such as automobiles, airplanes and ships, we see that a complete and total electronic communication system with fantastic capacity could be developed. By interconnecting such systems to large computer banks, it would be possible to transmit information instantaneously almost anywhere and to anyone in the country or the world. Obviously, such a system would have fantastic possibilities for the growth of this country in government, industry, and certainly, in education.

Total Electronic Communication System



HOW CAN THE SCHOOLS USE CATV?

Schools can use CATV in at least four broad areas. These are: instruction, in-service education, administrative communication and community information.

INSTRUCTION

Television for instructional purposes to classrooms has been in use in various parts of the United States for over a decade. One of the great limiting factors in the use of instructional television has been the lack of available channels. In areas of the country fortunate enough to have an educational television station, time is made available for broadcasting instructional programs. However, in most communities, there is only one station with limited time available. This has created a problem. First of all, it is impossible to individualize the instruction to any great extent because of the single channel for broadcasting the subjects. Secondly, it is difficult to provide for repeating various instructional programs because of the lack of channel time and space available.

With the advent of cable, instructional television could take on new dimensions. A greater variety of programing could be offered to better meet the individual needs of pupils in various schools. Repeating of programs would become more feasible, allowing for more individualized pacing of instruction. Because of the increased capacity of cable television, it would be possible to receive programs from a state or a national service, and also program some of the channels by the local school district itself.

Local programing could be accomplished if the school district owned a small studio and the necessary equipment to produce programs of specific local necessity. Since the cables could carry other kinds of signals, it would also be possible to use the cable for computer-assisted instruction in a variety of ways. The future also holds the possibility of being able to transmit electronically and print at local schools, necessary information for teachers and pupils,

which could be used in the classroom in conjunction with the instructional program.

IN-SERVICE

Another use for cable television would be for the in-service training of teachers and administrators. Although some efforts have been made in this area using broadcast television, one of the great problems is the availability of channel space. Many administrators are familiar with programs nationally produced, such as the Sunrise Semester. Unfortunately, these are broadcast at very inconvenient hours because of the relatively small number of teachers and administrators compared to the general audience. Commercial television stations cannot afford to broadcast in-service programs for teachers and administrators in prime day or evening time. Generally, it becomes necessary to rely on traditional means, having instructors from universities transported to the local district, or transporting teachers and administrators sometimes many miles to the nearest center for this type of instruction. With the great capacity of the cable, it would be possible to program in-service courses during convenient hours with repeats, if necessary, so that the effects of universities could be felt more effectively throughout the entire area. Instruction is very vital for teachers and administrators and could be provided more conveniently and instantly when it is needed.

ADMINISTRATION

The cable also holds great promise for use in school administration. Many school systems now rely entirely on meetings or printed memoranda for the communication of administrative matters. Holding central meetings must be done after school hours or during times when school is not in session. Printing of memoranda often becomes a burden because of the time delay required for printing and distributing. Through cable television, voice communication and printed information could be delivered to the local school instantaneously. The future holds great possibilities for making this communication system so that feedback information can be obtained instantaneously.

The cable could be used to connect the local schools to computer systems obtaining information on pupils, teachers, and other statistical information necessary to operate the local school. A two-way communication system would mean that schools could feed back information and update various kinds of information banks so that the banks would be instantly current for use by central administration and the local school administrators themselves.

THE COMMUNITY

Finally, since cable television would undoubtedly reach the homes in an area, it could be used for improving the link between the school and the community. It is becoming more imperative that school personnel improve efforts to reach the community as schools become more complex and the need for education becomes more urgent. Cable television can provide a direct link through the means of television, radio, and even printed information, to inform the community of its activities, plans, and methods of implementation of programs. With two-way communication, feedback information can be obtained from the community to achieve greater involvement in decision making and the operation of the schools.

The cable also offers great possibilities for interconnecting the local schools more effectively with regional, state-wide and even national sources of information. With education becoming more complex, the need for these communication systems will undoubtedly become more critical in the next decade.

Not all of the possibilities and applications mentioned here could be accomplished immediately, should a cable be installed in a given community. However, it is important that the school administrator becomes very aware of the present and future possibilities for the use of the cable, so that when such plans for installing cables are being discussed, the administrator can make his wishes known.

WHAT SHOULD SCHOOLS DO ABOUT CATV?

When installing a CATV system in any community, it will be necessary for the company wishing to install such a system to contact the local city government to obtain permission to install its cables. The school system should be alert and in communication with the local city government so that it can make its wishes known before any agreements are reached. Even before such time as a company wishes to install a cable system, meetings should be held with city officials to inform them of the potential that cable television has for education in the community, and to work out details of any ordinance that may be developed governing such cable installation within the community. When these meetings are held, the school administrator should have some rather definite wishes to be communicated and included in the ordinances. Although the specific requests for including education in any ordinance may vary from community to community, they revolve around three major items:

RESERVING CHANNELS

The first item is reserving specific channels for education. The second item is provisions for connecting the schools to the cables and the third item is provision of necessary information inputs.

In regard to item one, the number and kinds of channels to be requested by the schools depends to a certain extent upon the kind of cable or cables that will be installed. Even when a very limited type of cable is being installed, reservation should be made and protection should be obtained for expanded numbers of channels as the cable company increases its capacity in the future. One of the grave errors that school people make in requesting the use of channels is to request a specific or fixed number of channels. In asking for, let us say, three channels exclusively for the schools, the educator may feel that this is perfectly adequate for present needs and that it represents a reasonable share of the

total number of channels that will be available. However, as technology increases and the capacity of the cable increases from 12 to 60 channels, the provision for three channels is very small and may be very restrictive to the schools. Therefore, it is important to recommend a percentage of channels of the capacity of the system. If the capacity of the system should be increased, the number of channels to be reserved for the schools will also be increased.

There are two kinds of channels available on cables today. These are referred to as the standard channels and the non-standard channels, or the open-circuit channels and the closed-circuit channels. What does this mean? Most cables installed today are designed to carry Channels 2 through 13, covered by home television receivers. Most cables have capacity to carry frequencies below Channel 2, and frequencies above Channel 13. These channels could be used for transmission of television, radio, or any other kinds of information providing there are transmitters that can transmit on these frequencies and receivers that can receive the frequencies.

Today, television sets are not built to receive signals below Channel 2, or immediately above Channel 13. Therefore, the Channels 2, through 13, are called the standard or open-circuit channels, while the other frequencies that can be carried by the cable are called the non-standard or closed circuit channels. In addition to these non-standard or closed-circuit channels above and below the standard channels, there is also space between Channels 6 and 7, which is non-standard or closed-circuit. Administrators should be careful to obtain a percentage of standard channels as well as reserving some of the non-standard channels for future uses. If this is not specified the schools may find out too late that the channels actually given to them are channels for which no receivers have been built and which cannot be used at the present time. The schools must realize that in making their request, they cannot reserve all of the standard channels for their own purposes. There will be many other uses in the areas of entertainment, culture, business and city government for these channels. In most cases, if the school can reserve for itself at least one of the standard channels and 10 to 20 percent of all channels on the system, it probably will

have made as good a bargain as is possible. It should also be noted that these channels should be reserved for the schools to use free of charge.

CONNECTING SCHOOLS

In connecting the schools there is a wide diversion on what may be possible. Obviously, the reservation of channels will do schools little good if the school buildings are not connected to the cable. The cost of paying the monthly service charges for connecting the schools may make it impossible for the schools to use a cable system. Schools should request that the cable company connect the school buildings to the cables at no cost, with no monthly charges. Connecting the cable to the school does not get the signal into the classrooms. In some cases, companies have been willing to install outlets in every clasroom. In many cases, the installation to the individual classrooms is the responsibility of the school even though the company, at no cost, will provide the cable to the building.

Just as it is important to assure that the schools will be connected to the cable, the school must be sure that it can conveniently be connected to origination points of the cable. An ETV station may be automatically connected to the cable. The local school administrator should request provision for local origination so he can transmit local information from his administrative offices or other originating points. Very often the cable companies, if approached at the time of obtaining a franchise, will provide such a connection at no cost. Later, the cost may be considerable.

PROVIDING INFORMATION INPUT

Basically, it is the responsibility of the school administrators to decide upon and provide the necessary program material and information that will be transmitted over the educational channels for use by the schools. There are sources available in the area of television through several instructional television video tape libraries. Films also can be acquired from various sources. Films are copyrighted and clearances may be necessary before such films can be

transmitted. Schools may wish to produce their own television materials with their own facilities.

Radio programs can also be transmitted on the same cable. FM radio receivers connected to the cable could pick up such signals. Schools may wish to have production facilities for this FM service. In any event, it cannot be expected that the cable company will underwrite all of the cost of providing such materials to the school. In some cases, the local cable companies will have studios of their own which they will make available at no cost from time to time for this purpose, but this item, basically, remains the responsibility of the school administrator and not the cable company.

HOW TO GET STARTED

To assist the local school administrator in developing a plan of action concerning CATV, a checklist (see page 16) has been provided. Sections 1 through 4 deal with actions necessary to reserve and provide cable service for education. Sections 5 through 7 deal with the question of the school's responsibility to prepare itself so as to be able to make use of these cable services. School administrators can find assistance in this endeavor from their own audiovisual specialists. The school administrator should also explore assistance from universities, technical colleges, other school systems and both commercial and educational broadcasters. In addition to obtaining expert help, it is also important to involve teachers and the community concerning these activities related to CATV. This involvement can have far-reaching profitable effects for the successful use of CATV when it becomes available.

CATV ACTION CHECKLIST FOR SCHOOL ADMINISTRATORS

	YES	NO
1. Have city officials been made aware of the needs of the schools for the use of CATV?	___	___
2. Does the community have a CATV Ordinance?	___	___
If no, can city officials be convinced to write one, including the items in number 3?	___	___
3. If "yes" in number 2, does the CATV Ordinance:		
a. Reserve free standard channels for schools?	___	___
What percentage?____		
b. Reserve free non-standard channels for schools?	___	___
What percentage?____		
c. Assure free connection of cable to schools?	___	___
d. Assure free connection of cable to classrooms?	___	___

If not, what will it cost?_____

Who will fund the connections_____

e. Assure free use of the cable company's studio to the schools?	___	___

If yes, how much time?_____

	YES	NO
What kind of services?_____		
f. Assure free connection of the school's originating point to originating point of the cable(s)?	___	___
g. Require the cable company to carry at least one ETV station and one educational radio station?	___	___
4. If items in number 3 are not in the ordinance can city officials be convinced to include them?	___	___
5. Do the schools have a plan to use the cable:		
a. for instruction?	___	___
b. for in-service?	___	___
c. for administration?	___	___
d. for the community?	___	___
6. To use the cable do the schools have:		
a. Adequate originating equipment?	___	___
b. Adequate receiving equipment?	___	___
c. Adequate personnel?	___	___
d. Adequate funds for acquiring radio, TV, and other program materials?	___	___
7. If the schools are granted their requests, are they able and willing to meet their responsibilities for using the cable?	___	___

CONCLUSION

Developments in relation to CATV are occurring at an extremely rapid rate. The potential for these cables is almost unlimited. Administrators will have to be alert to the changing conditions and be knowledgeable of the existing limitations, capacities and possibilities of cable television. Most important, the school administrator cannot be short-sighted as he deals with this problem because he is not dealing with today but with the future of education in his area. His decision today could seriously affect the future development of education in his community.

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